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in Tennessee, each addict would consume approximately 1,000 doses each month, or 12,000 doses a year.

The State of Tennessee contains approximately 2 per cent of the total population of the United States, and on the supposition that the same ratio of the number of addicts and the amount of material consumed will hold good throughout the United States we would have a total of something more than 70,000 drug habitués, consuming approximately 850,000,000 average doses per year. This quantity is probably somewhat low, but it is fair to assume that not more than double this amount or approximately 1,700,000,000 average doses are consumed annually by drug habitués. The frequently quoted estimate that between 1 and 2 per cent of the population of the United States is addicted to the habitual use of narcotic drugs is undoubtedly too high, because of the limitations fixed by the available material. The figures at best, however, show the existence of all-too-many habitual users of narcotic drugs and suggest that anything that can be done to effectually reduce their number will be well worth while.

MENTAL DEFICIENCY.

SOME OF ITS PUBLIC-HEALTH ASPECTS, WITH SPECIAL REFERENCE TO DIAGNOSIS.¹

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The medical profession has been compelled, more especially during the past quarter of a century, to acquaint itself with the medical specialties. The medical schools have gradually added, during their third and fourth year courses, special subjects which must be pursued by the candidate for the degree of doctor of medicine. The science of medicine and surgery has naturally divided itself into subdivisions, and certain essentials in each subdivision or specialty are being taught and examined in at our colleges. These same essentials thereupon become the groundwork for the physician's activity in the field of practice.

The public has, again, demanded that the physician shall extend his field of activity—that he shall become acquainted with the essentials of mental deficiency.

It is safe to say that no State legislature, city council, or legislative body of any kind, will pass laws or ordinances concerning the segregation, commitment, schooling, or marriage of the feeble-minded without the advice and guidance of the medical profession.

Many physicians acting in the capacity of school examiners, no matter how they may dislike the task, will be compelled to give their opinion as to whether certain pupils are mentally defective. The

¹ Read before the Vermont State Medical Society, Rutland, Vt., Oct. 9, 1914.

disposition of these cases—that is, whether they shall be placed in special classes or separate institutions—will depend largely upon the medical examiner's judgment.

The physician will be called in to decide as to whether a given individual is to be committed to a home for the feeble-minded or to some other institution for the sick. The commitment of individuals, especially in juvenile cases, to penal institutions may rest upon the testimony or diagnosis of the physician. He will be consulted as to the feasibility of sending mentally defective patients to places for definite training. He will in many cases be consulted, as a first step, by parents and guardians when backward children are being taken to the specialist. No matter how disagreeable the work may be, nor how hard he may fight against it, he will nevertheless be called in, as a final reviewing authority, in practically all cases of mental deficiency.

On account of the increased amount of interest in this important public-health matter which has been manifested by the medical profession, school authorities, and the public in general, it may not be inappropriate to say a few words in a general way on the diagnosis of feeble-mindedness.

While there is dissimilarity, there is also much similarity in the symptomatology of so-called normal people, mental defectives, insane people, and neurotic individuals. There is no one mold into which any particular group will fit.

In certain respects these groups overlap one another. An individual is rightly placed in one of these groups only after carefully weighing all the symptoms and taking all circumstances and accompaniments of the case into consideration. A knowledge of the main features of normality, deficiency, dementia, and perversion will be of much assistance in correctly diagnosing a given case.

The physician's experience with neurotic and hysterical patients, his knowledge of deliriums and mental deteriorations, his observations and even trials with those who are emotionally disturbed, will stand him in stead when it comes to the diagnosis of mental deficiency. Likewise his knowledge of normal mental capacity and normal emotional reaction will be of much service when the diagnosis of mental deficiency is under consideration. Just as every normal person has his own peculiarities and every insane person his own definite attitude, so it is with the feeble-minded; they are all different one from another. There is no one list of symptoms or signs that will fit every case.

Locomotor ataxia would be indicated by the loss of one knee jerk, one Argyll Robertson pupil, and lightning pains, or loss of both knee jerks, ataxia, and bladder symptoms; or Romberg sign, inactive-to-light pupils, lightning pains, and specific history. So it is in the

case of feeble-mindedness; there is no one combination of symptoms or signs which can be relied upon.

In one case the diagnosis may be made by the patient's failure to perform tests A, B, C, and D, together with definite mental symptoms; again, a patient's case may be settled by the history, physical examination, and manner of performing tests C, D, and E. Still again, another patient will be diagnosed "feeble-minded" only after the result of three examinations and his failure to solve problems E, F, and G at one examination and his subsequent failure to succeed in tests M, N, and O at another examination.

Every suspected case must be considered from many angles before a diagnosis is finally made.

In any mental examination we must never lose sight of the fact that we may be dealing with a psychopathic condition, epilepsy, or some organic dementia.

The patient's conduct and peculiarities, family history, history of past diseases, developmental period, school life, employment, opportunities, general environment, age, sex, race, should all be carefully considered.

In all cases a thorough physical as well as mental examination of the suspected person should be made.

In some cases several examinations and a prolonged observation may be necessary to make a correct diagnosis.

With attention to practical psychology and with some experience with the feeble-minded on the part of the physician, I am strongly of the opinion that average physicians will have about the same idea concerning the subject of feeble-mindedness.

For instance, if Dr. A, a man of fair judgment and some experience, examines a number of children and finds 3 per cent feeble-minded, Dr. B, a man of similar experience and judgment, working on the same cases, but independently, will also find the same percentage of feeble-mindedness. The cases regarded as feeble-minded by one will be similarly diagnosed by the other. Both physicians will tell you that there are several other cases in addition to the feeble-minded that are rather hard to classify. These cases are dull, they fail to answer many of the questions, and they do not execute the performance tests well. With the generally poor showing, however, there has been an occasional fair answer, or there has been a fair showing in some particular mental field. Amid the many poor responses and performances there has been some well-executed performance. In other words, from the mental field of the subject there has been sent forth a ray of hope. This ray of hope in the mental field, together with the fact that the person under consideration is perhaps the possessor of some physical defect, such as enlarged adenoids, defective vision, defective hearing, chronic indigestion,

malnutrition, or some other organic condition, is sufficient to make the careful diagnostician hesitate in placing this individual in the feeble-minded group.

In some of these difficult-to-diagnose cases a correction of the physical defect will lead to a decided improvement in the person's mentality.

Other persons whose low mentality is probably due to environmental conditions and in whom no physical defect is demonstrable seem to have an awakening at a later period, which results in improved mental function. These are the so-called backward cases, the cases that possess the ray of hope. I believe that average physicians with some observation in this field by virtue of long and systematic training and peculiar¹ experience in the practice of medicine will come to about the same conclusions in regard to the feeble-minded group and as to just what cases should be placed therein. Often it may be hard to define their action or tell why they place a certain individual in a certain group. I have seen physicians in the Public Health Service working independently of one another on cases of suspected mental deficiency, and it has been surprising to note the similarity of their findings in regard to the mental status of a given case.

Reasoning power in the feeble-minded is almost always of a low order. They are unable to solve new problems; they can not meet new situations. As long as they are doing familiar things they get along very well, but when confronted with unfamiliar problems or conditions they are at a loss. They can do the same thing in the same way and can often explain to you what they do and how they do it, but when new premises or new data or old data in a slightly changed way are presented to them, they can not see the relationships imbedded therein. They are unable from given premises or from old materials to find new things. In any problem or new situation the feeble-minded lack the sagacity² to pick out the essentials and are lacking in ability to apply past experiences to present essentials. They are unable from a series of images to construct a new image; that is, they are deficient in constructive imagination, or, better, in reasoning power. While the memory is usually poor, it may in some instances be very good. A feeble-minded person may have many facts stored away—that is, he may have many fixed associations—but when the answer to our question or the solving of our

¹ The physician sees all kinds of neurotic, strange, disagreeable, trying, demented, delirious, hysterical people.

² "Sagacity" is almost a technical word in psychology and refers only to the first step in reasoning; that is, the step of abstracting an essential from a given datum.

problem can not be accomplished by giving forth fixed associations, but can be answered or solved only after weighing, comparing, and considering, we find that the result is almost always unsatisfactory.

Let me illustrate. The patient under examination upon request may enumerate the months of the year quickly and without an error. The examiner then asks him to give six months; that is, to skip every other month or to enumerate them in reverse order, December, November, October, September, etc. If the patient has never done this before, it immediately becomes a new problem, and it is here that the defective gives such an unsatisfactory reply. Thinking power is always shown when a fixed association is converted into a demand association. Again, suppose we find out that the patient can add certain digits; let us suppose that he has by persistent uphill effort formed the fixed association that $15 + 15$ is 30; then we slightly vary our question, making it somewhat new, and ask him how much are 15 and 17. The normal individual has the sagacity to see that $15 + 17$ is only 2 more than $15 + 15$, and this is the first and essential step in the reasoning process. The feeble-minded individual has not that sagacity; he can not pick out that essential step which is necessary for the reasoning process. In any situation or problem, if he does see the point and can reason, such ability is always limited in extent.

When a mental defective fails to grasp a new situation or to solve a problem, he can be shown the different elements of the problem and gradually taught to perform it. Defectives learn after many trials and with much more difficulty than do the normals. In fact, this difficulty in learning is a symptom of their mental condition, and tests have been devised to show the degree of difficulty with which they learn.

It must be distinctly remembered that when you show them how to perform a test, work a puzzle, or solve a problem, the successful doing of the test thereafter becomes a memory feat and not a feat in reasoning. Hence, if we are testing reasoning power we must see to it that there is a new and unfamiliar element in our test.

Easy arithmetical questions in addition and subtraction are excellent materials, as combinations of digits can be so varied as to form any number of new problems. Many of the questions and performance tests are designed to bring out this reasoning power, and care must be exercised that the patient has not been previously acquainted with the test.

While the memory of some feeble-minded persons is fair, others are very deficient in this mental field. Almost all of them are deficient in immediate retention, which can be demonstrated by the memory span test (repetition of figures).

The various tests and questions are designed to bring out what the patient has absorbed, that is to test his power of observation, conceptual power, and experience in general. The tests and questions are employed to show the quality and degree of his attention, immediate retention, and logical memory. They are devised to show the patients' perception of form, number, size, color, weight, and space. Some of the tests bring out his capacity for recognition and discrimination, and, last but not least, his learning power.

A number of test systems are in use. Each one has its advantages and disadvantages. It seems to me that all of them have been devised to explore exclusively one mental field—the intellectual. In all of the systems of examination little attention is paid to the volitional and emotional fields; the personality in toto is not surveyed.

The Binet-Simon system is most used. In using it, it seems to me that the examiner should modify it slightly to fit the particular subject under examination. I will give you only one example of what I mean.

The Public Health Service recently made a complete medical and sanitary survey of a penal institution. During the survey, I had the opportunity of applying the Binet test to 250 negro boys ranging in ages from 11 to 21 years. In the dissected-sentence test of the 11-year-old group, the boys did poorly; in fact, not one succeeded in making a perfect answer. It seems that there are three causes among the colored boys for failure in this test. In doing this test the words of the dissected sentence have to be rearranged so as to make sense.

Take the dissected sentence of the Binet series:

A—defends—dog—good—his—master—bravely.

In this case failure of the negro boys to make the proper rearrangement is probably due to:

1. Many negro boys do not read, or do not read sufficiently well to perform this test.

2. Owing to environmental conditions, the boys of this class do not use the word "defends." Such words are not in their vocabulary.

3. Their lack of knowledge in English grammar prevents them from properly using the word "bravely."

For the Binet dissected-sentence test I substituted dissected sentences the words of which are familiar to negro boys of this type, and purposely avoided the use of adverbs.

One of the dissected sentences which I substituted was:

Eggs—supper—boys—the—for—eat—and—bacon.

After making substitutions of this kind my results were uniformly good.

In using the Binet tests, or any other system, we must never forget that the results of such an examination are worthless if the

patient is emotionally disturbed at the time of the examination. Often the examiner must be keen and experienced in order to detect hidden emotional reaction.

It might be well for the physician, after surveying a number of intellectual tests, to select a certain number or to make up certain tests of his own, say four or five tests, and to become thoroughly familiar with them. He should practice then on normal individuals whenever an opportunity presents itself. As a special experience I would suggest that certain examples in addition, subtraction, counting backward, and cube test be tried on 100 children ranging from 7 to 14 years of age. After you have thus examined 100 normal persons, you will be thoroughly familiar with your own test; you will become familiar with the attitude of the normal subject, and you will note the variations and manner of performance. This manner of performance is very important. Then, when the feeble-minded person presents himself, your own-made machine will assist you in analyzing his mental condition, and proving him to be feeble-minded.

The selecting of a few tests that suit you, and thoroughly familiarizing yourself with them by testing normal persons, will give you a foundation in the field of mental deficiency. It will be the acquisition of certain practical essentials in the field of mental defect, just as you have acquired certain essentials in the field of ophthalmology, dermatology, and other specialties.

The following list shows some of the performance tests which are used by the Public Health Service to assist in diagnosing cases of mental deficiency:

Healy Frame.
Healy Fernald.
Cube test.
Vineland form board.
Form board (Knox).
Geographic.
Casuist.
Frame test.
Marble box.
Modification.
Weights.

Visual apprehension.
Report.
Description.
Copying.
Drawing from memory.
Memory test.
Learning.
Relationship.
Counting dots.
Inverted pictures.
Moron.